with such attention to detail, that they afford very strong evidence as to the appearance of these species now in many cases extinct. Lastly, there is the interest attached to the chronological order of the paintings as it may be determined by an examination of those examples far from rare in which one figure is superimposed on another. The evidence from this source is not, however, so complete that we can tell the order in which certain animals have become extinct. We find by a curious caprice that the mammoth, for instance, in "La Caverne de Font-de-Gaume" appears only in "paintings" belonging to the first and fifth periods.

There is naturally a special interest in those frescoes in which Man himself is the subject. Unfortunately there is no clear and full representation of Man. The figure in the cave Hornos de la Peña is almost certainly not that of a man. There is, however, a very spirited delineation of a human arm in "La Pasiega," while the number of times in which the human hand is depicted is remarkable. Representations of the left hand preponderate greatly over those of the right hand, a fact which is explained no doubt rightly by assuming that man had already ceased to be ambidextrous. It is a very curious coincidence that among the native Australians the custom of drawing or painting the hand on the wall of a cave is not infrequently practised. The accompanying figures show how closely related such examples may be. In Australia the boomerang is often found associated, while in Spain instruments of a similar shape are also sometimes introduced. Naturally there are many other markings the meaning of which it is difficult to determine, "tectiform," "scutiform," "claviform" figures. It is tempting to think that some of the former are meant to represent huts, it is at any rate difficult to know what else they could be while their resemblance to the homes of primitive people in all parts of the world is striking.

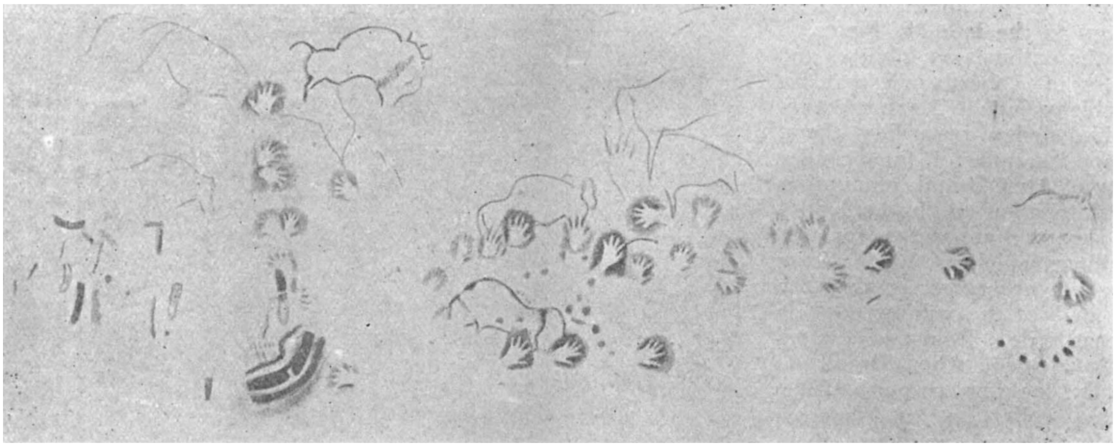

Fig. 2.—Fresco of hands, animals and weapons (?) on the wall of the cavern at Castillo. From "Les Cavernes de la Région Cantabrique."

The value of these important books, the great labour they have entailed, the vast knowledge they have exacted, will be readily granted when it is further noted that they include a "description raisonée" of all the animals depicted, a description based on an examination of all the art specimens extant representing the animals, whether gravure, carving, or "painting." There is again a very careful and scientific comparison made between these old examples and those of the modern African Bushman.

The books constitute, with the archæological books already published from the Monaco press, a series of classics which mark an epoch in the history of our knowledge of archæology. They enable us to view the past as through a telescope.

William Wright.

THE HOPE REPORTS.[1]

If anyone would undertake the task of writing the history of zoological science during the past fifty years, an interesting chapter could be written on the attitude of the leading authorities towards the work of the pure systematist.

Fewer than fifty years ago every zoologist who ventured to express his opinions on the philosophical questions that gathered round the science was a recognised authority on the systematic zoology of some one group of animals. Haeckel had studied the Radiolaria and Medusæ; Darwin wrote a monograph on the Cirripedia; Huxley contributed to our knowledge of the systematic zoology of the Siphonophora. But the time came when, for a period, the study of a special group was discouraged, and the student, passing from his course of general study, started on his investigations on embryology or morphology, without taking the trouble to become acquainted with the difficulties of systematic work, or to train himself in the observation of minute differences of structure upon which the arrangement of animals into specific groups must, in so many cases, be based.

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[1] The Hope Reports. Edited by Prof. E. B. Poulton, F.R.S. Vol. viii Appendix, 1890–1910, Including Five Sub-families of the Blattidæ. By R. Shelford. Vol. viii., 1910–13. With a Separate Appendix. Vol Ix., 1911–13. The Natural History and Description of African Insects, especially the Acræine Butterflies. (Oxford, 1913.)

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The value of such work was well expressed in the letter written by Huxley to Francis Darwin ("Life of Darwin," vol. i., p. 347), which begins with the sentence:—"In my opinion your sagacious father never did a wiser thing than when he devoted himself to the years of patient toil which the Cirripede book cost him."

The three volumes of the Hope reports that have recently been issued may be regarded as an indication of the revival of systematic zoology after a period of comparative neglect, and a sign that some of our best thinkers are beginning to realise that "the great danger which besets all men of large speculative faculty is the temptation to deal with the accepted statements of fact in natural science as if they were not only correct, but exhaustive."

The entomologists who are associated with Prof. Poulton in the Hope Department at Oxford are engaged in the study of large and important speculative questions, but, as these volumes show, their work is based upon the careful detailed study and descriptive statement which pure systematic work demands. They have the great advantage which the rapid growth of the collections in the Hope department affords of basing their conclusions upon the study of a very large number of specimens that have been sent to the museum from various parts of the world by the band of skilled collectors and keen observers that Prof. Poulton has interested in his work; and whether we agree with the conclusions or not, we must feel confident that the work has been done with a thoroughness and wealth of illustration that has probably been unequalled in the history of speculative zoology.

Our interest naturally centres, in the first instance, on the progress that has been made during the period, of which these volumes form the record, in the study of mimicry and protective resemblance. It has been urged so frequently as an objection to the theories of Batesian and Müllerian mimicry that the insects that are supposed to exhibit them are not subject to the attacks of birds or other vertebrates gifted with eyes that can see or be deceived by colour patterns; and that the palatability of their flesh cannot in any way be an advantage to them in their struggle for existence; that the experiments in this connection of Mr. Pocock on the palatability of British insects, and the observations of Mr. Swynnerton on butterflies attacked by birds in Rhodesia are of special interest. The negative evidence of observers who say they have never seen a particular species of insect attacked by birds is really of very little value compared with the positive evidence that is accumulating, and the onus of proof is now shifted from those who support the theory of mimicry to its opponents.

But a still more interesting discussion for the general reader upon which these volumes throw much new light is on the question of the origin of the mimetic forms. Have, for example, the four mimetic females of the well-known African butterfly *Papilio dardanus* arisen by sudden mutations, or by the natural selection of small variations from a common type? It will be difficult for Prof. Poulton to persuade the mutationists that they are wrong, that in this particular instance the many transitional forms between the dominant mimetic forms that the Hope collections include do indicate that it is by the selection of slight variations in the right direction that the similarity between the mimics and their models has been reached, but the gradually accumulating series of facts bearing upon this discussion which these volumes contain are of extraordinary value in giving those who have not yet declared themselves on one side or the other a rich harvest for their consideration.

It is in a discussion such as this that the trained eye and detailed knowledge of the systematic entomologist is of supreme value, and the weighty article by Mr. R. C. L. Perkins on the colour groups of Hawaiian wasps, and the paper by Colonel Manders on his temperature experiments on Danais and Hypolimnas in Colombo, will be read with much interest.

It is quite impossible in a short notice to do justice to the many articles of interest that the volumes contain, but special attention may be directed to the interesting address by Dr. Dixey, as president of the Entomological Society, on the effect of external influences on the germ plasm in insects, and the evidence it affords bearing on the theories of evolution, and to the essay by Mr. Guy Marshall on the limitations of the Müllerian hypothesis. To the morphologist, Prof. Poulton's memoir on the structure of the lepidopterous pupa, and Mr. Eltringham's account of the male genital armature of the species of the genus Acraea, and to the systematist Mr. Shelford's elaborate and beautifully illustrated memoirs on the Orthoptera, Mr. Eltringham's important contributions to our knowledge of the African species of the genus Acraea, Colonel Bingham's memoir on the Aculeate Hymenoptera and other shorter papers will prove to be of interest.

Prof. Poulton and his colleagues may be heartily congratulated on the extensive and important contribution to knowledge they have made during the period that is covered by these three handsome volumes.

S. J. H.

DR. MAWSON'S ANTARCTIC EXPEDITION.

DR. MAWSON has returned from the Antarctic to Australia, and readers of his message to the *Times,* recounting his wonderful escape after a month's march alone, when he had witnessed the death of two companions, will congratulate him on the courage and endurance which saved him from an end like theirs. The three were on a march of exploration south-eastward from the main base in Adélie Land, in November-January, 1912–13, when Lieutenant Ninnis fell with a loaded sledge into a crevasse. Dr. Mertz and Dr. Mawson, in the face of starvation owing to this disaster, returned to within one hundred

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